

ance. Vessels near by apparently encountered moderate weather only. However Capt. C. V. Nissen of the American steamship *Mexoil*, from New Orleans to Tampico, forwarded a special report in which he states that on June 27, 9 p. m., in 25° 18' N., 93° 46' W. he encountered this storm, and estimated the strength of wind in squalls at 80 miles an hour. The lowest barometer was 29.56 (uncorrected) at 2 a. m. on the 28th, wind SE., 8 to 10, heavy rain squalls, wind of hurricane force. End of gale, 8 a. m. on the 28th, wind S., 6. Sea moderating.

On the 26th a moderate depression was over the middle section of the steamer lanes; this moved rapidly eastward, and on the 27th was central near 46° N., 25° W. On the 27th there was also a depression over Newfoundland and moderate southerly gales prevailed between the Bermudas and fortieth parallel.

For the remainder of the month moderate weather was the rule over the ocean as a whole, although a few vessels in widely scattered localities reported winds of force 7 and 8.

## OCEAN GALES AND STORMS, JUNE, 1929

Vessel	Voyage		Position at time of lowest barometer		Gale began	Time of lowest barometer	Gale ended	Lowest barometer	Direction of wind when gale began	Direction and force of wind at time of lowest barometer	Direction of wind when gale ended	Highest force of wind and direction	Shifts of wind near time of lowest barometer
	From—	To—	Latitude	Longitude									
NORTH ATLANTIC OCEAN													
Saguache, Am. S. S.	New York	Copenhagen	53 06 N	31 11 W	May 31	June 1	June 1	Inches 28.87	ENE	ENE, 7	ESE	9	ENE-E.
Examelia, Am. S. S.	Mediterranean	New York	39 27 N	25 52 W	31	—, 1	2	30.00	SSW	SSW, 8	W	SSW, 8	
Cornelia, Am. S. S.	New York	Porto Rico	32 20 N	70 40 W	June 10	8 a, 10	10	29.66	S	S, 8	SSW	S, 8	S-SSW.
New York City, Br. S. S.	Fowey, England	Portland, Me.	51 20 N	31 15 W	9	8 a, 10	12	29.39	SSW	WSW, 7	NNW	—, 9	S-SW.
Exhibitor, Am. S. S.	Marseille	Boston	41 35 N	51 20 W	12	Noon, 12	12	29.78	SW	WSW, 7	WNW	WNW, 8	WSW-W.
Coshoma County, Am. S. S.	Rotterdam	New York	48 48 N	17 15 W	11	Noon, 12	14	29.82	SW	SW, 8	SW	WSW, 9	W-SW.
München, Ger. S. S.	New York	Southampton	48 56 N	18 33 W	11	—, 13	14	29.65	WSW	W, 10	W	W, 10	W-NNW.
Middleham Castle, Br. S. S.	Gaeston	Havre	41 01 N	36 30 W	12	4 a, 15	17	29.96	SW	NNE, 6	NNE	NE, 8	
Trinidadian, Am. S. S.	Tampa	Port Arthur	28 16 N	88 03 W	24	11 p., 24	25	29.92	S	S, 7	S	S, 9	Steady.
Bird City, Am. S. S.	New York	Copenhagen	46 16 N	41 23 W	25	4 p., 25	27	29.66	W	W, 6	NNW	NNW, 8	NNW-E.
Wm. G. Warden, Am. S. S.	Montreal	Christi	38 51 N	62 18 W	26	Noon, 26	27	30.01	SW	SW, 8	SW	SW, 8	Steady.
Gulfoil, Am. S. S.	Port Arthur	Philadelphia	29 24 N	93 28 W	28	8 p., 28	28	29.93	SE	SE	SE	SE, 8	Do.
NORTH PACIFIC OCEAN													
Corinto, Am. S. S.	San Francisco	Cristobal	16 22 N	99 46 W	1	1 p., 1	1	29.52	NW	W, 9	SW	WSW, 10	NW-W-SW.
Mojave, Am. S. S.	San Pedro	Nagasaki	30 58 N	141 02 E	1	4 p., 1	1	29.45	S	SSW, 11	SW	SSW, 11	SSE-SW.
Havana Maru, Jap. S. S.	do	Yokohama	33 30 N	142 00 E	1	8 p., 1	2	29.41	E	NE, 8	SE	NNW, 10	ENE-NE-N.
Wisconsin, Am. S. S.	Hong Kong	San Francisco	30 30 N	132 50 E	3	1 p., 5	5	29.51	SSE	SSE, 7	SSW	SSW, 9	SSE-SSW.
Ayaha Maru, Jap. S. S.	Yokohama	Victoria	39 28 N	148 00 E	6	10 p., 6	7	29.10	E	ENE, 8	NNW	ENE, 8	6 points.
Golden Star, Am. S. S.	Otaru	San Francisco	49 26 N	178 36 W	5	12 mid	6	29.20	WSW	NW, 7	SSW	SW, 9	
Do	do	do	48 47 N	159 54 W	7	1 a, 8	9	29.27	E	SW, 7	SE	SW, 9	
Clydefield, Br. M. S.	San Pedro	North China	35 15 N	159 45 E	7	4 a, 8	9	29.82	SSW	W, 8	NW	S, 8	SW-W-NW.
Manoa, Am. S. S.	San Francisco	Honolulu	37 34 N	123 18 W	12	4 p., 12	12	30.02	N	N, 8	NNW	N, 8	N-NNW.
Silverguava, Br. M. S.	do	Yokohama	41 30 N	132 20 W	15	10 a, 15	16	29.67	SSW	SSW, 6	W	W, 8	
Victorious, Am. S. S.	Honolulu	Colon	14 08 N	103 20 W	16	4 p., 16	17	29.66	NNE	E, 9	SSE	E, 10	Steady.
City of Victoria, Can. S. S.	Tsugaru Sts.	San Francisco	42 22 N	153 00 E	19	2 p., 19	19	29.02	SE	SSE, 7	W	SSE, 8	SE-S-WSW.
Boren, Swed. S. S.	Manila	do	44 21 N	140 44 E	21	Noon, 22	22	29.92	ESE	SSE, 8	S	SE, 9	ESE-S.
Grays Harbor, Am. S. S.	Puget Sound	Yokohama	42 15 N	149 30 E	16	10 p., 16	17	29.17	ESE	SSW, 8	SW	SE, 9	S-SSW-SW.
SOUTH PACIFIC OCEAN													
Maunganui, Br. S. S.	New Zealand	Sydney, N. S. W.	36 02 S	154 30 E	9	4 p., 9	10	29.46	W	SSW, 8	SSW	SW, 9	S-SSW-SW.
SOUTH ATLANTIC OCEAN													
Nevada, Dan. S. S.	Rotterdam	Buenos Aires	34 30 S	53 12 W	11	8 p., 11	12	29.60	E	SSE, 9	SSW	SW, 10	E-SSE-SW.
Vandyck, Br. S. S.	New York	Montevideo	28 41 S	47 21 W	12	8 p., 12	13	29.93	SW	SW, 8	SSW	W, 9	

551.506 (265.2)

## NORTH PACIFIC OCEAN

By WILLIS E. HURD

The conditions of atmospheric pressure in June had changed but little from those prevailing in May, except that as a rule the average barometric readings were somewhat lower over the eastern part of the ocean, St. Paul, in the Bering Sea, being the only station, among those given in Table 1, with pressure higher than in the preceding month. The Aleutian cyclone was well developed for the season; it was centered in its fluctuations principally near or south of Dutch Harbor, though on several days it lay over the Gulf of Alaska. On a few days of the month, during incursions southward from the gulf, it affected the weather along the Washington, Oregon, and upper California coasts, causing a few moderate to fresh gales in the vicinity.

Owing to the persistence of the Pacific-California HIGH, fine anticyclonic weather prevailed along the greater part of the steamer routes between the United States and the Hawaiian Islands, except east of the one hundred and thirty-fifth meridian, where fog was frequent.

Barometric data for several island and mainland coast stations in west longitudes are given in the following table:

TABLE 1.—Averages, departures, and extremes of atmospheric pressure at sea level at indicated hours, North Pacific Ocean and adjacent waters, June, 1929

Stations	Average pressure	Departure from normal	Highest	Date	Lowest	Date
	Inches	Inch	Inches		Inches	
Point Barrow <sup>1</sup>	29.65	—0.34	29.96	20th	29.06	9th.
Dutch Harbor <sup>2,3</sup>	29.81	—0.08	30.18	29th	29.34	9th.
St. Paul <sup>2</sup>	29.81	—0.13	30.46	2d	29.32	12th.
Kodiak <sup>2</sup>	30.13	+0.06	30.32	29th	29.86	2d.
Midway Island <sup>2,4</sup>	30.04	0.00	30.14	10th	29.90	21st.
Honolulu <sup>2</sup>	29.90	—0.11	30.35	22d	29.32	15th.
Juneau <sup>2</sup>	30.09	—0.05	30.49	19th	29.38	15th.
Tatoosh Island <sup>2,6</sup>	29.95	—0.01	30.22	18th	29.70	23d.
San Francisco <sup>2,6</sup>	29.91	+0.03	30.08	9th	29.75	27th.
San Diego <sup>2,6</sup>						

<sup>1</sup> Data insufficient to use.<sup>2</sup> P. m. observations only.<sup>3</sup> For 23 days.<sup>4</sup> For 25 days.<sup>5</sup> A. m. and p. m. observations.<sup>6</sup> Corrected to 24-hour mean.

Gale weather moderated over the North Pacific to only a slight extent during June, as compared with that of May, although gales were scattered and few exceeded force 9. Such as were of force 8 and upward were reported on 13 days. The region of most frequent storminess lay east and south of Japan, where numerous depressions and cyclones from both tropical oceanic and middle and upper continental sources occurred. Other gales were reported from the west coasts of Mexico and the United States, and on two or three occasions in upper midocean. The only instances of whole to storm gales were those associated with storms of the tropics.

From the 1st to the 7th of June at least two typhoons occurred in the waters of the Far East. One, which originated in May in low latitudes, skirted the southeast coast of Japan late on June 1 and disappeared at sea far east of the Kuril Islands on the 3d. This typhoon attained to at least storm force on the 1st, the American tanker *Mojave* encountering southwesterly gales of force 11, during the afternoon, near 31° N., 141° E., lowest pressure 29.45. The Japanese steamer *Havana Maru* on the same day, in 33° 30' N., 142° E., reported a whole gale from north-northeast, barometer 29.41 inches.

The second typhoon remained in the upper part of the China Sea from the 1st to the 4th, when it turned oceanward between China and Luzon and, crossing Taiwan, continued northeastward. On the 5th and 6th it proceeded over the lower islands of Japan and entered upon the ocean. The bureau has no record of severe gales attending its progress. However, while in the China Sea on the 2d to 4th, the Dutch steamer *Kertosono* was under the southward influence of the typhoon, though it was not until the 4th that she ran into moderate southwesterly gales at the rear of the retreating storm, barometer 29.73, in 12° 57' N., 116° 27' E. The following is an extract from a radiogram sent to the department of terrestrial magnetism, Carnegie Institution, on June 2 by Capt. J. P. Ault of the American nonmagnetic yacht *Carnegie*, with reference to this disturbance:

Dodged typhoon night of June 1-2. Barometer was dropping rapidly and wind and sea increasing. The storm center position for the previous two days received by radio from the Manila observatory was immediately plotted and path predicted as about to intercept our track. We at once headed out toward east by south and as we drew away from the center of the storm the barometer rose slowly and wind moderated. We ran for two hours and then hove to and waited for wind to moderate for another two hours. We then set sail on course for Yokohama, riding the tail of the typhoon. The wind continued to shift slowly to the right as the storm receded from us toward the northeast. This was our first experience in handling a storm by radio, and everything went like clockwork and exactly as we predicted from knowledge by radio of storm's position and probable path.

This typhoon was encountered by the American steamer *Wisconsin* on the 5th, highest wind force 9 from south-southwest, pressure 29.51, near 30° N., 135° E., and by the Japanese steamer *Ayaha Maru* on the 6th and 7th, wind east-northeast 8, barometer 29.10, near 40° N., 148° E.

According to the Tokyo weather maps another typhoon appeared northeast of Luzon on the 28th, and was central on the 30th near 26° N., 129° E., apparently moving northward.

The tropical hurricane reported last month as existing southwest of the Gulf of Tehuantepec at the end of May, continued into the first day of June, when it appeared central off the coast of Mexico close to Acapulco. The southbound American steamer *Corinto* reported strong to whole west to west-southwest gales for a few hours near midday, lowest barometer 29.52, in 16° 22' N., 99° 46' W.

On the 16th and 17th another tropical cyclone appeared at sea southwest of Acapulco, but at a greater distance from it than its predecessor. At this writing the storm has been reported by only one vessel, the American steamer *Victorious*, which ran into the gale zone of the storm with an east wind of force 7 at 4 a. m. of the 16th, in 14° N., 103° 30' W., and left it more than 24 hours later, with wind south-southeast, 7, in 13° 50' N., 101° 23' W. The highest wind experienced was force 10, from east by south, lowest barometer 29.66, at about 4 p. m. of the 16th. The cyclone can not be traced farther at this writing.

At Honolulu the prevailing wind was from the east, the trades blowing on all days of the month except the 18th, when there was a change to southerly. The maximum velocity was at the rate of 24 miles an hour from the east, on the 14th.

Fog showed a generally higher percentage of occurrence than in May over most of the northern half of the ocean, with the greatest frequency along the upper steamer routes between Japan and the one hundred and eightieth meridian, where the percentage averaged 40 or slightly more. East of the meridian the percentage lessened to about 20 south of the Gulf of Alaska, then increased to about 30 per cent along the central coast of California, once more decreasing to 25 per cent off Lower California. Two to four days with fog were reported along the lower routes between Japan and midocean, and the thirtieth and fortieth parallels, and 10 days with fog in the eastern part of the Bering Sea.

#### NOTES BY OBSERVERS

*Fall of pumice.*—American steamship *Grays Harbor*, Capt. F. P. Willarts, observer B. Fullington, second officer, Puget Sound to Yokohama:

On June 16, 9:58 p. m., L. M. T., in latitude 42° 15' N., longitude 149° 28' E., vessel ran into a heavy fall of pumice, or volcanic ash. The sky was overcast, wind southwest, whole gale, lasted about two hours.

June 17, 9:56 p. m., latitude 41° 43' N., longitude 148° 50' E., pumice began falling again much heavier, so thick that it was necessary to sound the fog signal. Pumice covered the vessel with a coating about 1-inch thick. Cleared up again in 41° 24' N., 148° 24' E., having fallen for about five hours. A radio report from Japan stated that Mount Homagatake erupted early on 18th, the discharge of smoke and ashes being violent. This mountain was about 360 miles from ship.

The American steamship *City of Victoria*, Capt. Gilbert Smith, was in the fall of pumice in the same vicinity on the 17th and 18th to the eastward of Tsugaru Straits. On the afternoon of the 17th it was reported that the pall of smoke and ash "put the ship in total darkness for two hours."

*Phosphorescence.*—Dutch steamship *Kertosono*, Capt. W. P. van Meerkerk, observer W. N. de Wijn, Manila to Los Angeles:

June 27. (G. M. N. latitude 36° 28' N., longitude 125° 20' W.) Passed from 8:15 to 10 p. m. through a field of strong phosphorescence, light green colored and white on crest of sea. The whole scene was lighted as if it were daytime.

*Trade winds.*—British tanker *British Star*, Capt. T. S. Ridley, observer P. R. Harris, Chanaral, Chile, to San Pedro:

21st June, noon. Southeast trades encountered in latitude 20° S., longitude 75½° W. These trades were exceptionally strong, at one period reaching force 7, with heavy southeasterly sea and swell. On leaving Chanaral 19th, June, 8 p. m., a northeast gale was encountered with heavy continued rain. Wind veering abruptly from northwest to northeast, then back through west to southeast trades.

28th, June. Lost southeast trades in latitude 3½° N., 95½° W. 1st, July. Encountered northeast trades in latitude 10½° N., longitude 100° W.

3d, July. Lost northeast trades in latitude 19¼° N., longitude 108¼° W.